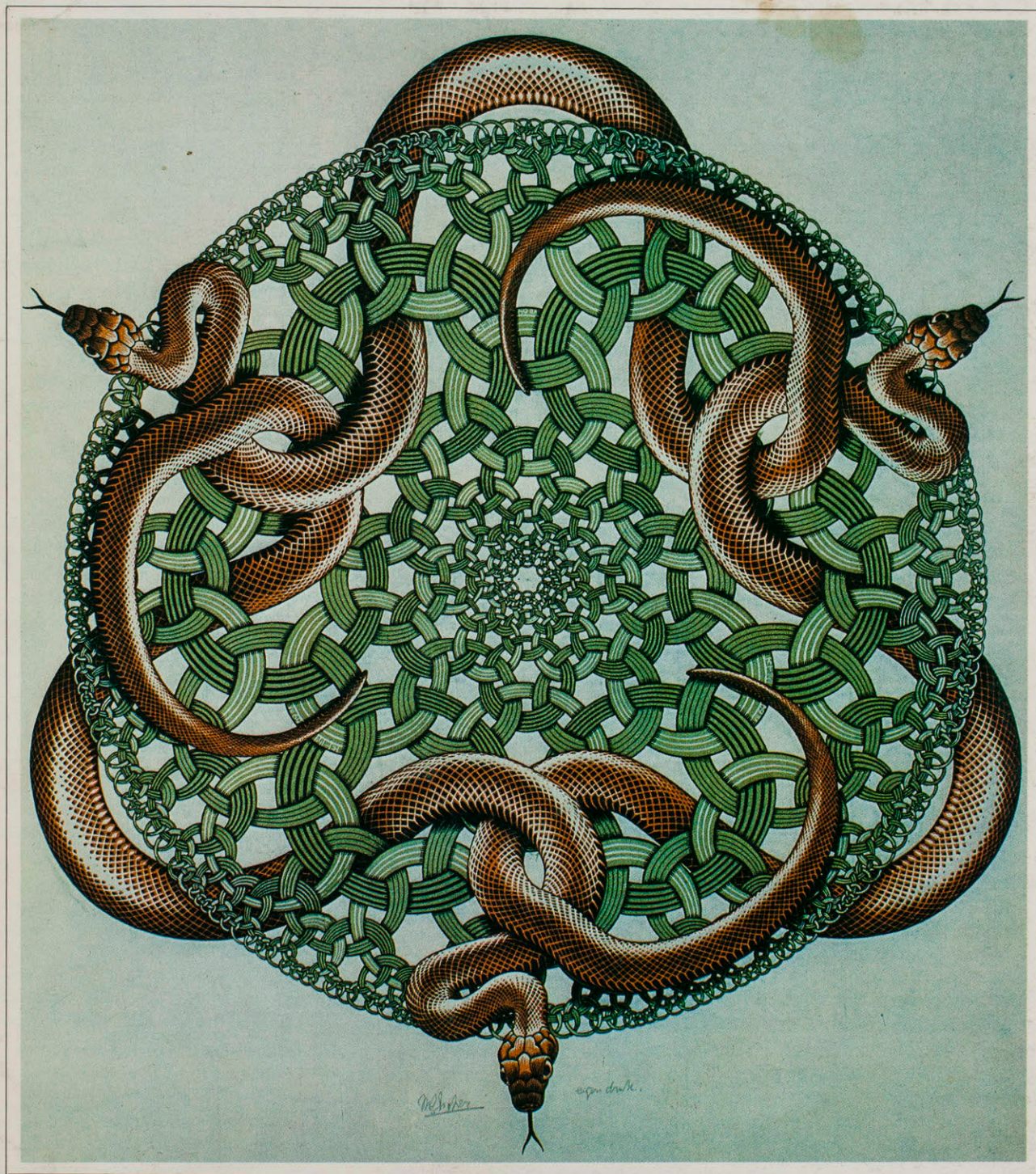


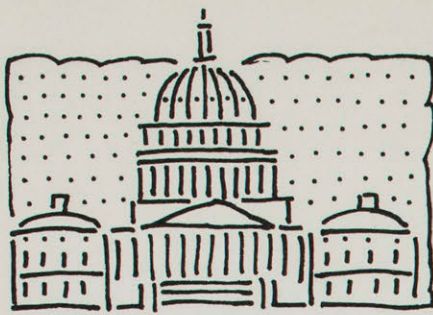
THE QUARTERLY MAGAZINE OF THE NATURAL
HISTORY MUSEUM OF LOS ANGELES COUNTY
VOL. 11/NO. 2 FALL 1972

Terra

\$1 single copy



NATURAL HISTORY AND THE ART OF M. C. ESCHER



Cherry Blossoms . . . Washington . . . Winterthur April 5 to 12, 1973 Washington D.C. Wilmington, Del.

Eight fun-filled days to explore your nation's capitol, to feel the pulse of international life as well as visit many of our famous national art treasures, tour the Smithsonian Institution complex, including the National Gallery, Natural History Museum, Freer Gallery of Oriental Art, and the Museum of History and Technology Today. We have been invited to

visit the Diplomatic Reception Rooms of the State Department.

Your trip is timed to include the famous Georgetown House Tour with distinguished houses and famous art of notable personages. One day will take us to the magnificent estate of the late Henry Francis du Pont near Wilmington where Mr. du Pont combined vision and patience in the development of his residence and museum. Fourteen rooms of the South Wing of the Winterthur Museum invite you to enjoy the interior architecture, furniture and decorative accessories of 1684 to 1840 arranged as they might have stood in those days.

We have been invited to visit the Dumbarton Oaks Museum and Gardens. Miss Elizabeth Benson, Curator of Pre-Columbian art, will give us a special tour of their collection. You will also want to tuck in visits to Georgetown's galleries and shops, perhaps wander the Corcoran Gallery, the Folger Shakespeare Library and the Renwick Gallery. There will be time to explore the delicious delicacies of Maryland crab and Chesapeake shad in the fascinating restaurants that draw politicians and diplomats.

We have been invited to visit the Zoo and see the Pandas have their morning repast.

This tour will be limited to a maximum of 30 people (minimum 15). Call Alathena Miller at Kerr-Travel Service if interested. (273-0150)

"Natural History and the Art of M.C. Escher"

The first retrospective exhibition
of Escher's graphic works to be seen in California.

**Evening Preview for
Museum Alliance Members:**

January 16, 1973

will include two films on Escher's work followed by a Reception

**Show Open to the Public:
January 17-April 16, 1973**

Alliance Members admitted free
on presentation of membership card.
All other adults \$1.00; children 50¢



The Quarterly magazine of
THE NATURAL
HISTORY MUSEUM
of Los Angeles County
VOL. 11/NO. 2 FALL 1972

contents

To Cast a Lovely Dream	3
Suiseki	12
California Christmas	18
The Plants of Yuletide	20
Dinosaurs of Baja California	26

All Rights Reserved.
Reproduction in whole or in part,
without permission is prohibited.

EDITOR/Dorothy H. Seligman
ASSOCIATE EDITOR/Harry Pack
ART EDITOR/Frank Page
ASSISTANT EDITORS/Giles W.
Mead/Gretchen Sibley/William
A. Emboden Jr./Kilbee Brittain

EDITORIAL ASSOCIATES
Sage Belt/Jane Dart/Theodore Downs/
Peter Furst/Glenn Hiatt/Betty Reddin/
Katharine Hotchkis/Harry Kelsey/
Richard Lipscomb/Fred S. Truxal/
Robert Wade/Robert Weinstein
STAFF PHOTOGRAPHER/Armando Solis
STAFF ILLUSTRATOR/Mary Butler

TO CAST A LOVELY DREAM

"While drawing I sometimes feel as if I were a spiritualist medium controlled by the creatures which I am conjuring up. It is as if they themselves decide on the shape in which they choose to appear."

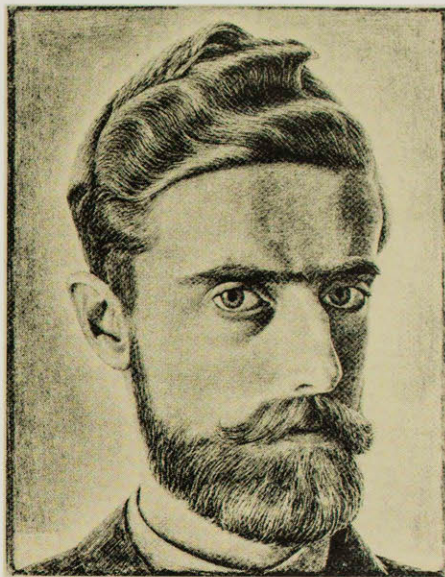
Such is the substance of thought of Maurits Escher, reflecting upon the nature of his extraordinary graphic work. When viewing the execution of a drawing or print as the casting of a lovely dream, Escher is expressing ideas akin to those of the famed psychologist Jung in which the work appears from a primitive archetype image; he himself never considered this to be an adequate explanation. Not since the late fifteenth century and the inception of the renaissance has an artist been such an extraordinary pioneer in revolutionizing concepts and problems basic to the natural sciences, the physical sciences and mathematics. There is probably a greater affinity between the genius of Maurits Escher and Leonardo da Vinci than there is between the former and other contemporary artists. Both were essentially problem-solvers guided by extraordinary intellects and an inner vision which almost unconsciously led them to explorations and solutions in every sphere.

Maurits Escher was born in 1898 in Leeuwarden, Holland, not too far from Amsterdam which was at that time one of the great centers of "Style Nouveau," which relied heavily upon design and ornament. By the time he entered the School of Architecture and Ornamental Design in Holland, the Art Nouveau period had ended and the undulating lines of this style were giving way to principles expounded by the Bauhaus artists, who reacted to the fluidity of the former period by a more structured art and forms that had their basis in symmetry rather than organic nature. Thus, Escher under the tutelage of S. Jessurun de Mesquita, was caught between these two periods which are so obviously represented in most of his graphic studies.

Rejecting neither the fluid line of living organisms nor the rigid architecture of crystals, he initiated a series of woodcuts which were highly intellectual in their bases as exemplified by notebooks and the accumulated working drawings. The overwhelming number of illustrations from his initial sketches until his final woodcut (*Ringsnakes*, 1969) are depic-

"TO CAST A LOVELY DREAM:" NATURAL HISTORY AND THE ART OF M. C. ESCHER

by William A. Emboden Jr.



Self-Portrait. 1929.

tions of nature brought into a problematical bond of union (as he entitled one of his 1956 pieces) filled with the interlocking symmetrical planes of the tiled walls of the Alhambra and as fraught with assymetry as Antonio Gaudi's tiled benches in the Park Guell.

Escher was one of those rare and curious artists without a school to which he might attach his name and his graphic output. When confronted with two alternatives he chose both and mastered them, confounding those who would like to categorize each artist. His fascinating tessellations must stand apart as a bizarre, enigmatic body of scientific ideas in spectacular presentation, which were for the most part formulated apart from complex publications in science which Escher admitted were beyond his comprehension. Yet in formulating his "layman's theory" he was often ahead of the scientists. For example, physicists have admitted that Escher explored the symmetry elements of polychromatic groups before official crystallographers had expounded such notions (notebooks, 1942).

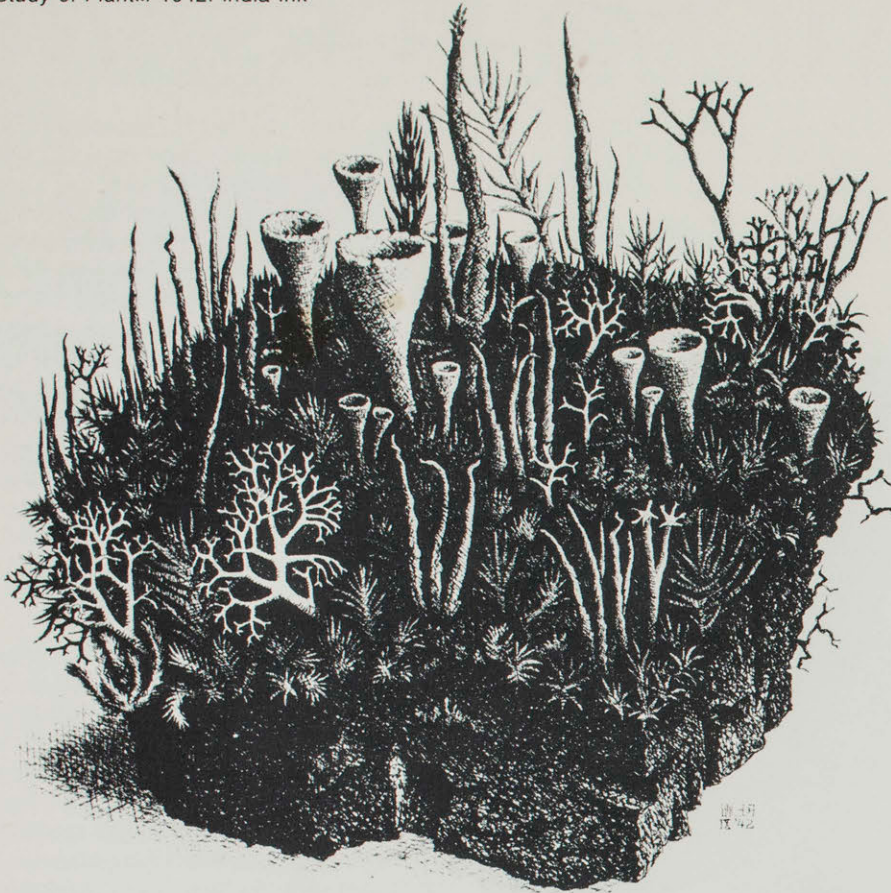
It is difficult to accept the scholarly division of the work of Escher into cate-

gories, such as pre-1937 observational work and post-1937 inner reality or "visual thinking," as these conventions have no reality if one surveys the work. Among the late pieces are the fascinating study of plants consisting of a block of lichens (1942) in rather straightforward representation, as compared to his earlier tessellations and arabesques. Just as Escher is an artist without a school, he is a thinker whose works are not easily divided into chronological categories. Perhaps his preoccupation with architecture and spatial phenomena was gradually augmented with the particular in presentation, but most of the thematic material is recurrent and the treatment consistent.

Not given over to copying the works of others, I can think of only one instance in which Escher reverted to the work of another artist; in 1935 he executed a lithograph, which was a set of variations on *The Garden of Delights* by Hieronymus Bosch, and here Bosch is credited as "inventor." This view of life obviously coincides with the fantasy life of Escher and his fantastic view of the world. Like Bosch, he chose to *interpret* the world rather than *present* it, and from the ideas of life he chose his material.

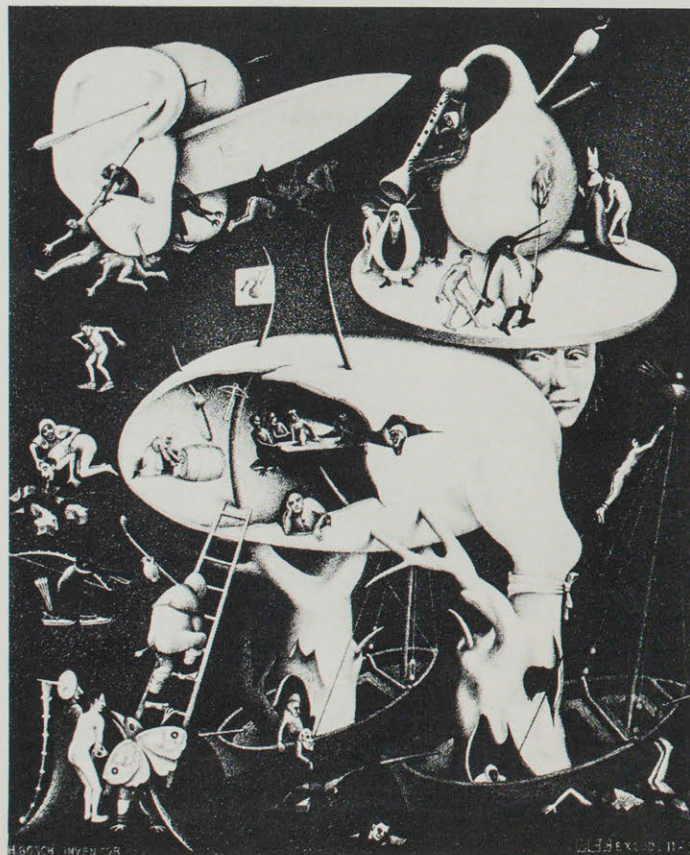
Organisms and inorganic crystals are but vehicles for ideas which are often thematically repeated. As early as 1953 the double helix was figured in his work as an idea which later was to be the form for DNA, the molecule basic to life—a concept enunciated by Watson and Crick in that same year. Moreover, that same helix becomes, in his later work, a prefiguring of one of the forms which DNA is found in the nucleus, i.e. that of a moebius band. Just as he prefigured the ideas of crystallographers, he also anticipated ideas basic to the natural sciences.

Occasionally, he would study an organism for form only, but more often the organism was later to be used in the enunciation of an idea. *Scarabs*, a wood engraving of 1935, could be taken simply as the behavior of that family of beetles which rolls its egg in a ball of dung; however, retreating to archetypal ideas, typical of Escher, the beetles recall the Egyptian interpretation of these organisms as god-like, in that the egg-dung ball was rolled each day into the sun for purposes of incubation. This led



4

Copy of a detail
of the painting
"The Garden of Delights"
by Hieronymus Bosch.
1935. Lithograph



the ancients to the concept of the beetle being like god, who rolled the sun across the sky each day; thus the organism and its egg mass becomes emblematic in Escher's portrayal.

This might seem excessive in interpretation, but if we look at the series of studies of the preying mantid (*Mantis religiosa*), executed between 1930 to 1935, we see the development of a similar idea in which a simple pencil sketch of a mantid is juxtaposed with a crayon drawing of a bishop's tomb, and ultimately the mantid is seated on the torso of the dead bishop's effigy under a starry sky (the wood engraving, *Dream*, 1935.)

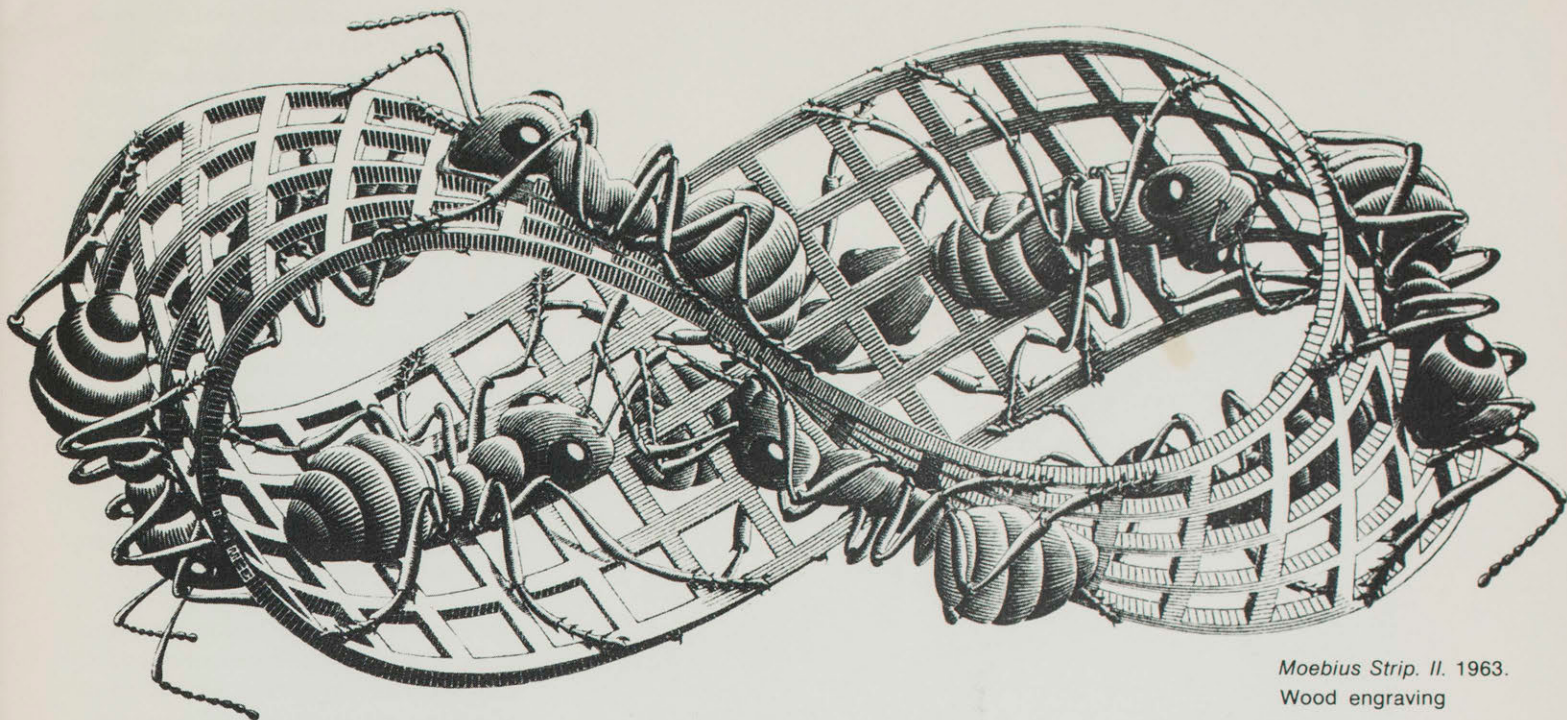
Just as Leonardo da Vinci's plant studies between 1500 and 1510 were later found in his paintings, these simple animal studies of Escher were often the vehicles for the development of an idea of strange proportions.

Nature transmogrified by the lens, whether it be a crystal sphere, a hand lens, the lens of an eye, a drop on a leaf, or a body of water, is a recurrent motif and can be seen in at least fifteen of Escher's studies. The capillaries of a leaf stand magnified beyond the proportions of the rest of the leaf's venation; an eye catches the head of Death in its lens; the facade of a building bulges in ghastly disharmony with the rest of the structure, or a reflecting pool becomes at one time both earth and sky.

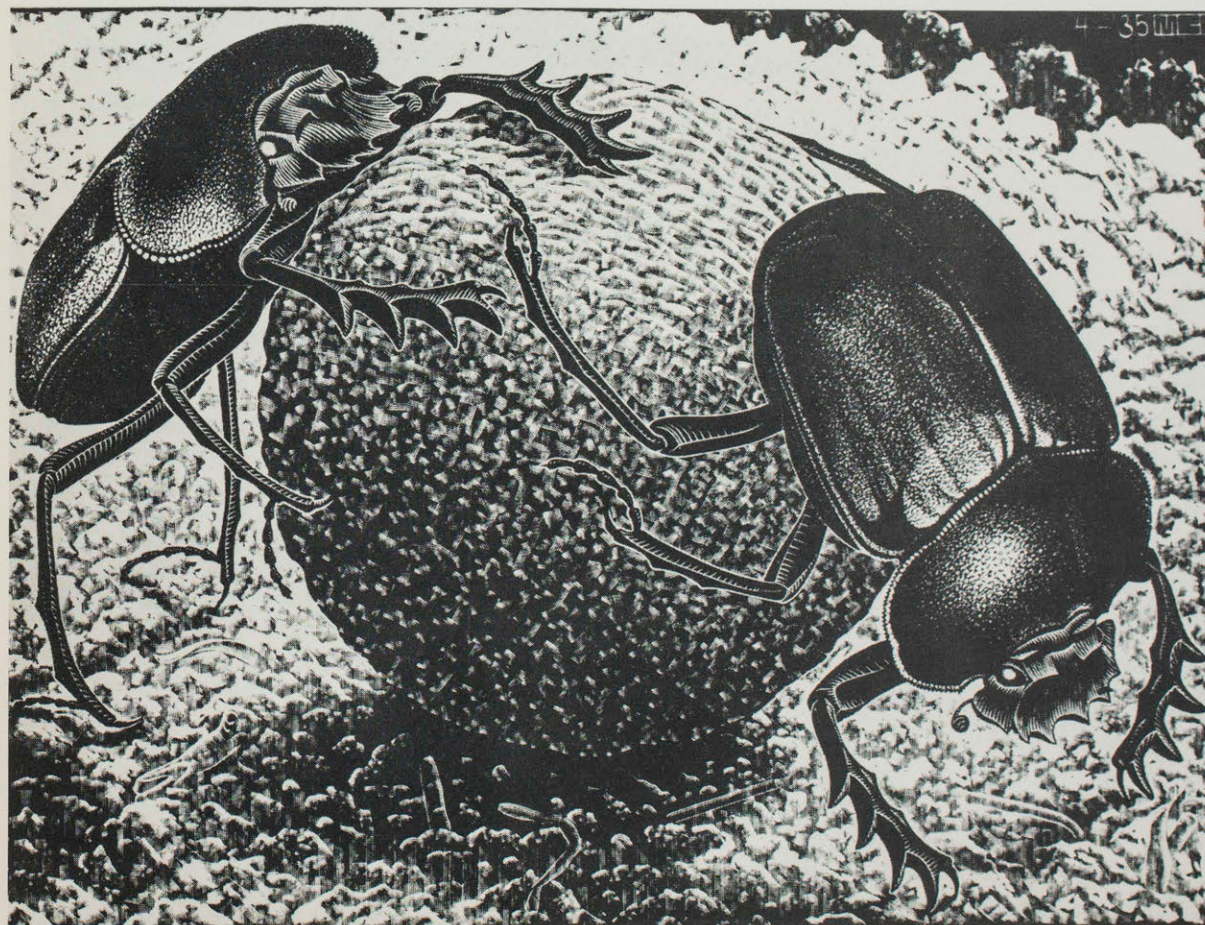
He portrayed his father holding a hand lens in 1935, and the definitive portrait of the artist himself, executed as a lithograph in 1935, is a distorted image seen by the artist as he holds a crystal ball in his hand.

Optics was a discipline which seemed to intrigue the artist throughout his life, even to the last of his works, the woodcut *Ringsnakes* (1969), in which the interwoven serpents form a kaleidoscopic design which diminishes into a theoretical infinity at its central vortex, never breaking the pattern of interlocking rings; truly this is a vision of a madman or genius. Not only is the design remarkable, but the color gives an extra dimension to the work. Those who have experienced the kaleidoscopic tunnel vision promoted by mescaline will know the substance of this dream; it is a personal vision that some people induce and others realize only in an exalted state of consciousness.

From the aforementioned print we can launch into his concept of finite reality and the infinite. These frequently occur within the confines of a closed circle or circles; *Day and Night*, *Cycles*, *Swans*,



Moebius Strip. II. 1963.
Wood engraving



Scarabs. 1935. Wood engraving



Dream. 1935. Lithograph

Dewdrop. 1948. Mezzotint



Reptiles, *Verbum*, and *Magic Mirror* all exemplify this. Realizing that he could only suggest, and not attain, the infinite left Escher dissatisfied. He was not content with *Smaller and Smaller*, in which interlocking concentric tessellations of amphibia must reach resolution in their finite portrayal at the outer margins and the systematic reduction by half toward the vortex must also eventually reach the limits of human resolution. The series *Circle Limit*, executed in four different statements, are more satisfying, and yet infinity in a self-contained whole is an extravagant notion beyond realization.

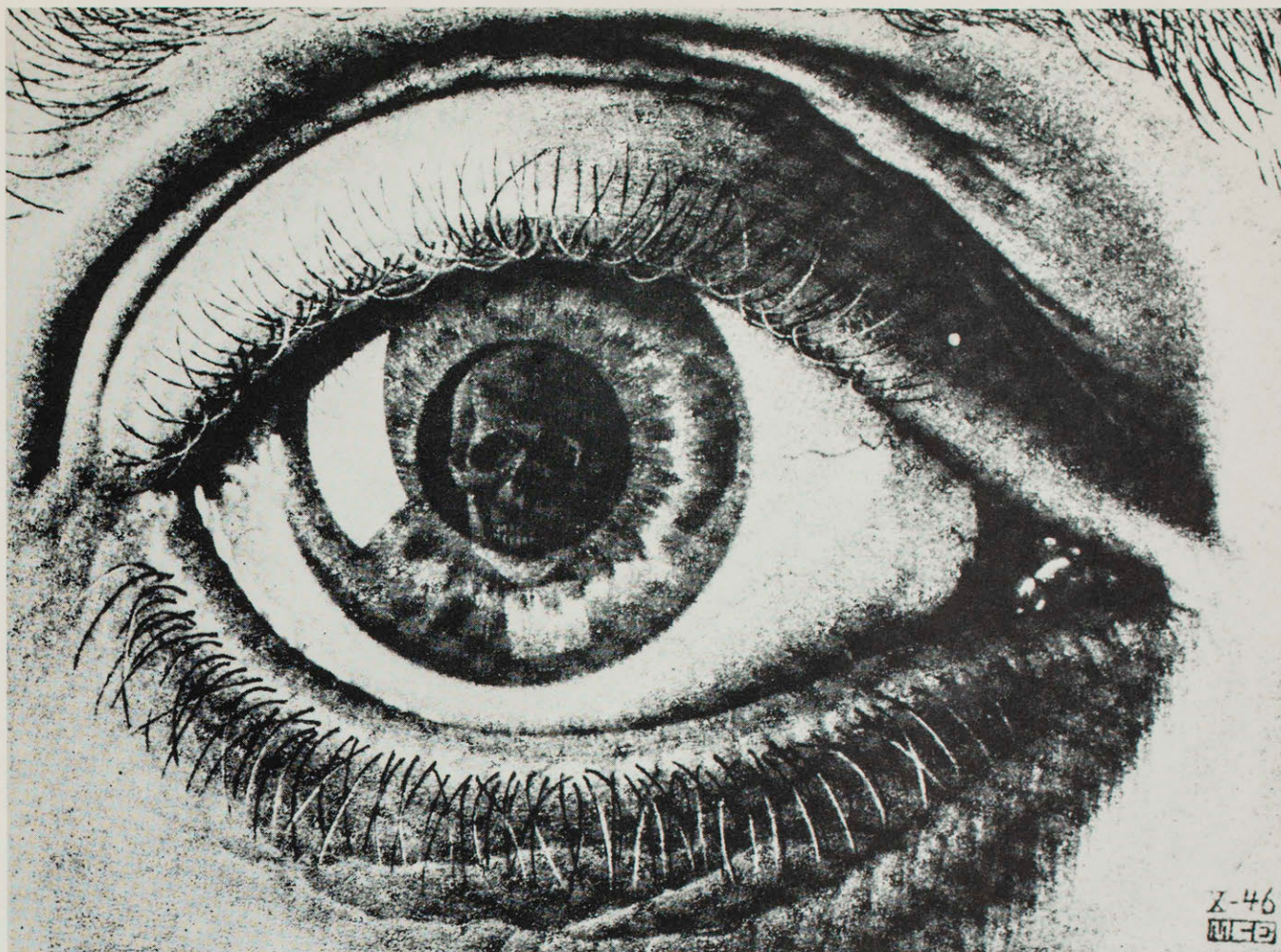
Perhaps in *Ringsnakes* he achieved consummate success in portraying the idea of infinity, for reason of not attempting to portray the infinite, but only suggesting it and leaving it to completion in the mind's eye.

Evolution as a notion has for over a century transfigured both art and science; few artists have understood it, and scientists are still expounding upon it and amusingly "reproving" it in endless papers. For Escher, fish become fowl, reptiles become men, and men become geometrical abstractions. Less simply, a spiral of reptiles may become a geometric chessboard.

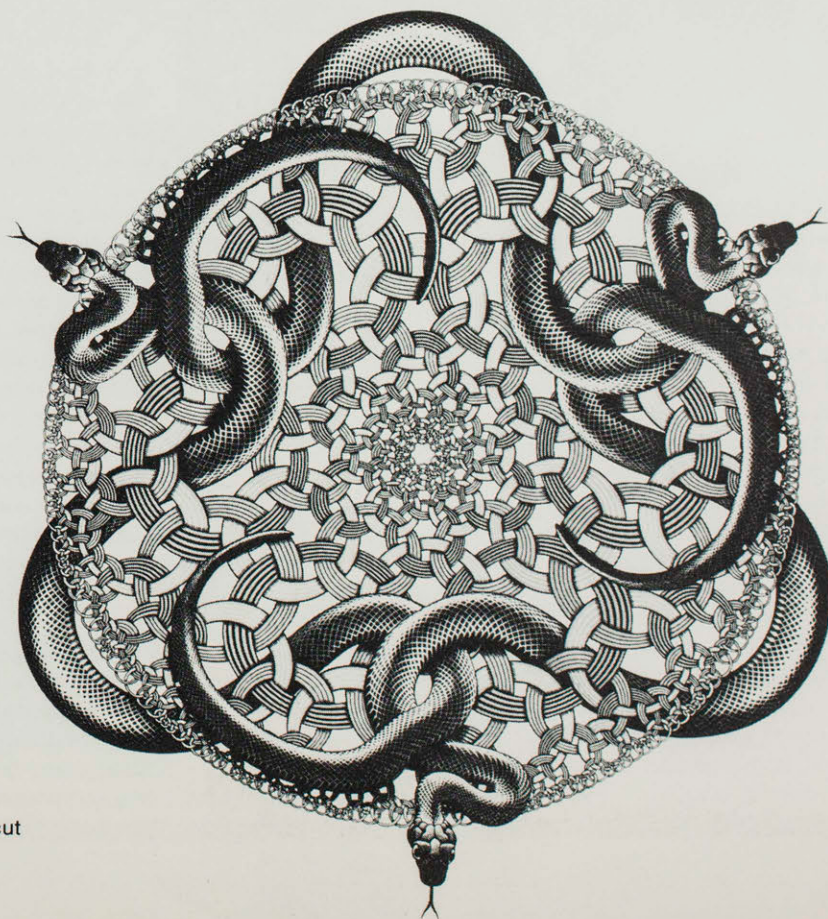
In the most complex of these visions, *Metamorphosis II* sequential stages of change complete themselves in a series of prints that were intended to join at beginning and end if formed into a cylinder. Alpha and Omega meet and are one, all is change. We are led from the depiction of a word "metamorphose" (in the beginning was the word) into a series of alternating animal forms and geometrical configurations, until ultimately a three-dimensional chessboard gives way to the conventions of a simpler geometry, and we are led back to the word once more.

In his metamorphic prints (if they may be termed such) we encounter time, dimension, seasonal and diurnal variation and abstraction. Mirror imagery is always in evidence, just as it is in all of life from the rotational forms of molecules to the peculiar symmetry and mirror imagery in the hands of man.

The autobiographical content in the work of Escher is high, not merely in the self portraits (which are numerous), but in the oblique references to himself, his ideas, and even to a view of his work as seen by others (e.g. *Print Gallery*, 1956). Self cognition and recognition are apparent in *Reptiles* (lithograph, 1943), in which Escher has drawn an account of one of his studies of reptiles which



Eye. 1946. Mezzotint



Ringsnakes. 1969. Woodcut



8

was executed in pencil in 1939. From this drawing emerges the living organism which scales a book on nature, bridges the book to a polyhedron by way of a draughtman's triangle and via a cup of cigarettes and matches reenters the drawing. Appointments in this fascinating study are a packet of Job Cigarette Papers, which are of no use since the artist has depicted prepackaged cigarettes, but it is most likely an allusion to the open book in the upper right-hand corner of the print—the biblical book of Job? Escher denied it. The cigarette papers rest under a planting of a cactus and an agave, an island of nature, and in the lower right-hand corner is a jug with a glass—water? This study must be taken as the artist's microcosm, in which the world view is reduced to personal creation, transformation, nature, and a rejection of the word for the world. Not

that Escher rejected the word as a way of knowing, for in a preface to a presentation of his graphic works he states that most people comprehend the word more readily than they do images; nonetheless he is determined that the personal vision prevail, for one does not displace the other.

The anticlerical views attributed to Escher are not well grounded, in that his graphic pieces that make allusion to clerical ideas utilize them to express the concept that it is the business of life that should occupy our attention. If Saint Francis is to have a halo, why not a similar nimbus for his animal counterparts? If in *Vitchoriano* (1925), the sainted corpus is presided over by a raven and wolves, well, then, that is the nature of things.

References to "The Church" were more prevalent in his early work. *Pro-*

cession in Crypt (1927) shows ghostly monks passing through a low-vaulted crypt carrying candles, and has no anticlerical content, merely a study of light and shadow. Similarly, *Castle in the Air*, done in the following year, is an allegory on the schism between the Church Spiritual and the Church Temporal. Humanity cries out on the back of a turtle, destined to submerge, while *The City of God* floats way into the sky leaving only a shadow on the water. In 1931 a woodcut, *The Drowned Cathedral* shows a Gothic cathedral up to its flying buttress in water, while a sailboat glides by on a starry night. This piece is typical of this period of thought when the works of man were awe-inspiring to Escher and yet seen as doomed. Just as the small Corsican cities he loved were depicted jutting out precariously over the sea, fated to crash onto the rocks and ocean

continued on page 10

Let Us Take Care of Your Holiday Shopping

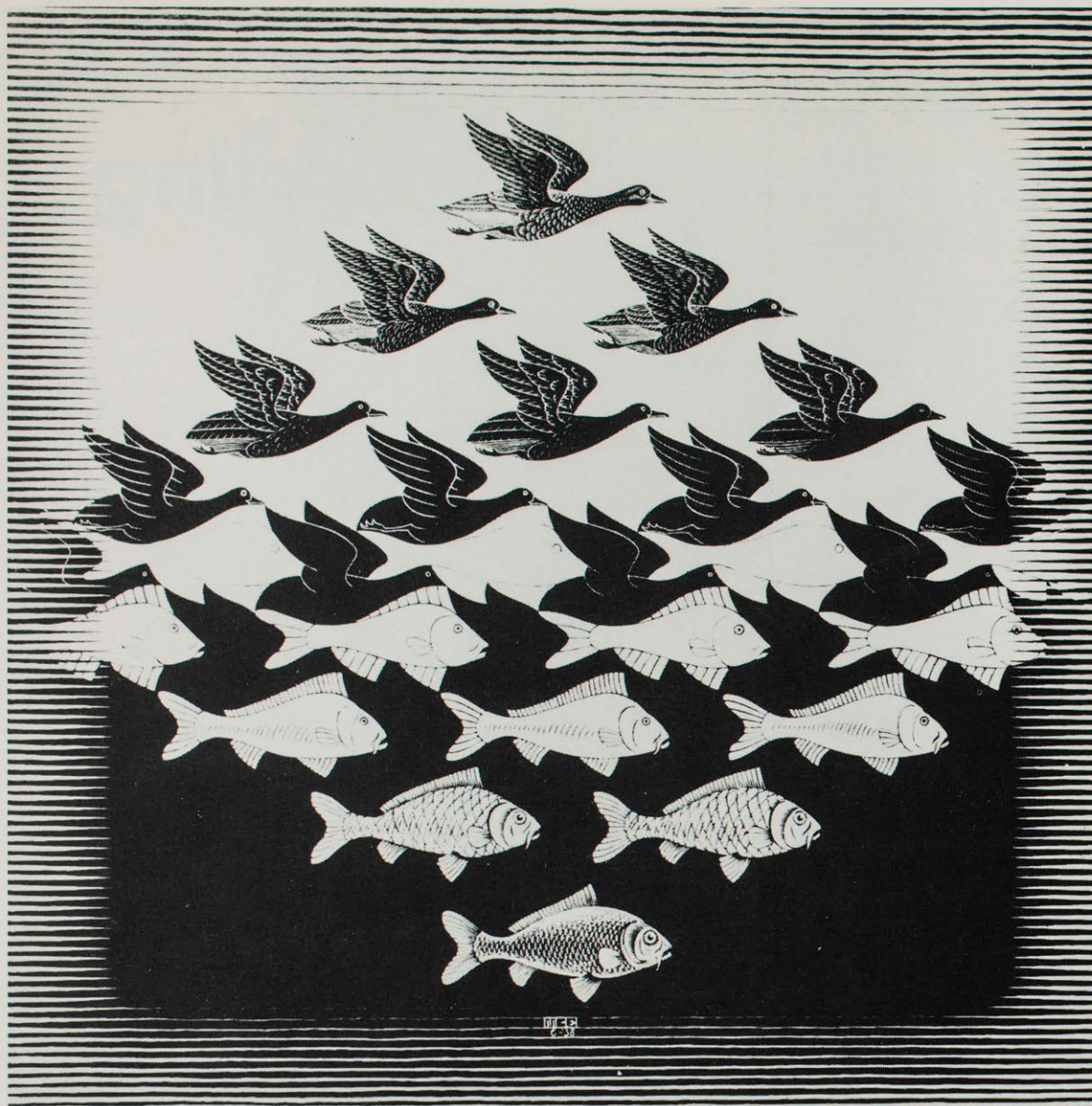


Be An Armchair Shopper

Museum Alliance Memberships are the best Holiday Gifts for those Special People you want to remember all year long. Where else will \$12.50 buy so much! We will send a Holiday Gift Card in your name. A Gift Membership may be entered in the following categories. Active \$12.50 Annually • Sustaining \$100 Annually Contributing \$25.00 Annually • Life \$500 Single Payment • Corporate \$100-\$1000 Annually

**Use the
Attached
Postage-Paid
Envelope**

It's That Easy!



Sky and Water I. 1938.
Woodcut

below.

It is as though he is saying "all is vanity" but unlike the prophet of old, there is always the feeling that nature will survive when the vain products of man's invention are lost. All of this is seen with wry amusement as exemplified by the mummified bishops drawn while in southern Italy. All of these allegories have a fundamental truth in nature apart from any supernatural interpretations. Neither man nor his institutions and architecture are timeless, and all will pass on to the worm.

It is appropriate that homage to the genius of Mauritis Escher be the subject of an exhibition in the Natural History Museum of Los Angeles, for it has always been the province of the scientists to appreciate the oeuvre. The first occasion for an exposition of Escher's work was the International Congress of Mathe-

maticians meeting in Amsterdam, at which time the Stedelijk Museum presented a retrospective. Another occasion for such an event occurred in 1965, when the International Union of Crystallography organized an exhibition and published an account of symmetry aspects of Escher's periodic drawings. Now that the work of this master has ended, it is appropriate to review the strange output of wondrous, extravagant graphics that transcend absurdity, chaos, plurality and contradiction by an ultimate logical concept of the world.

One of Escher's favorite author's was Lewis Carroll, who is noted for his mathematical puzzles, games, and narrative play of seeming contradictions. Escher confessed to believe the credo of another mathematician, J. L. Synge, who found that he was at his best when playing, for in that play there may be an

element of truth. That is to say scientists are aware that things are seldom as they seem and even natural laws are theoretically mutable. In interpreting his world, Escher has captured all of the frivolity, contradictions, lovely dreams, and nightmares that are existent, and brought them into comprehensible forms never without reason and logic, and often with a great deal of humor.

Acknowledgements: Both the exhibition, which opens in January, 1973, at the Natural History Museum of Los Angeles County, and cuts in this essay are through the courtesy of Vorpall Galleries, San Francisco.

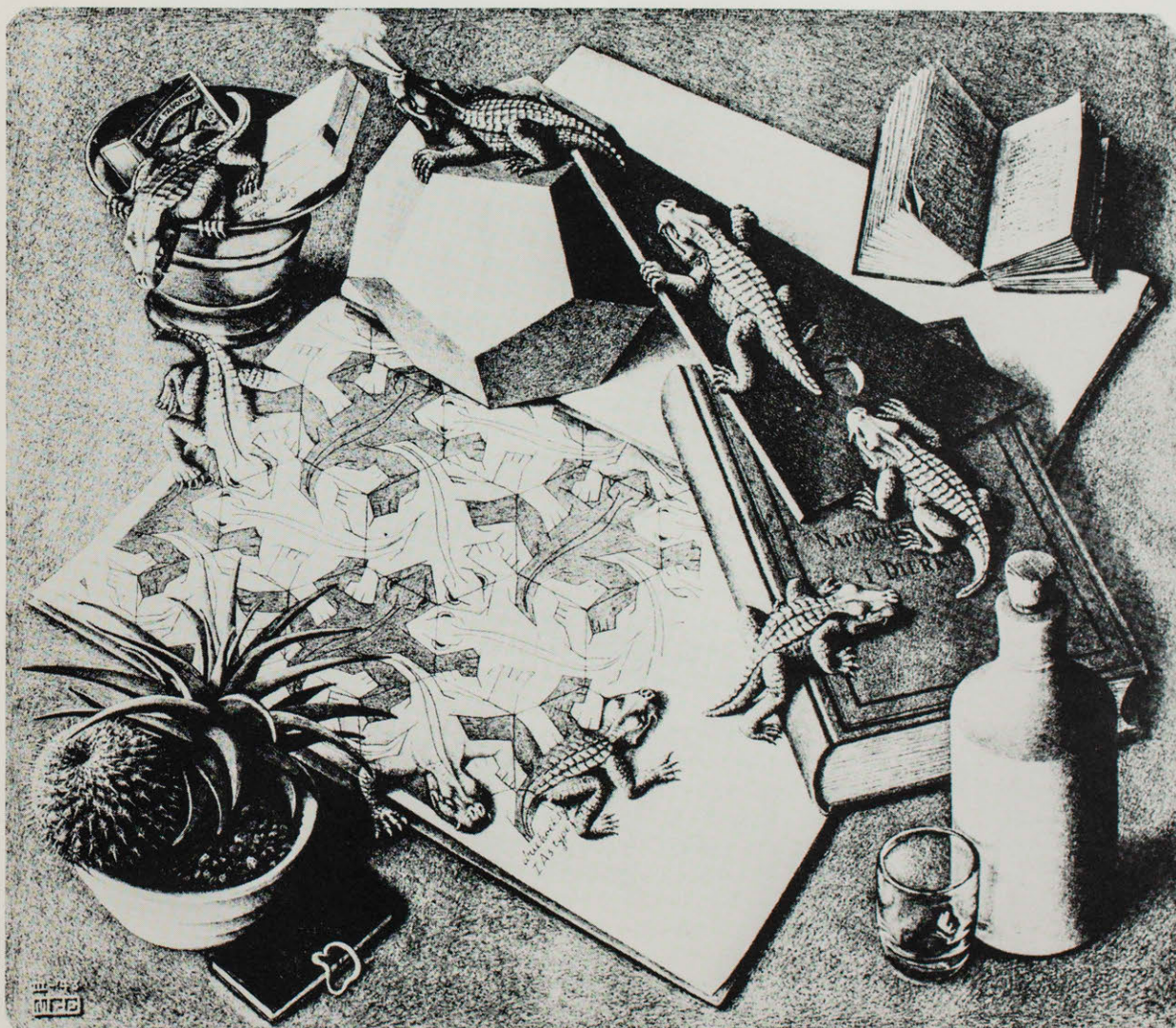
Dr. William A. Emboden is Acting Senior Curator of Botany, Natural History Museum of Los Angeles County and professor of Biology, California State University, Northridge.



Selfportrait. 1943. Scratch-drawing in lithographic ink



St. Francis. 1922. Woodcut



Reptiles. 1943.
Lithograph

SUISEKI

The ancient Japanese art of
Suiseki—a new philosophy of rock collecting.

by Toy Sato



Japan is an island country of mountains and volcanoes fringed with coastlines of jagged rocks, high cliffs and sunny sands. It is like a half-moon stretching for 1,200 miles from Hokkaido, with snow-capped lofty mountains in the north, to historic and beautiful Kyushu in the southwest. Honshu, the largest of the big islands and the hub of activity, is almost 800 miles long. For every square mile of land, there are nine miles of coast line. More than 80 percent of this land is mountainous, with parts of it marked by high peaks and deep valleys.

Because of its geographical isolation and its closed door to foreign nations for such a long time, the Japanese developed a very strong tendency toward cultural conservation. Instead of the old and outmoded being pushed aside by foreign pressures, it was proudly preserved with the new. Even in this modern age, with European and American influence creeping in, Japanese heritage is held dear and their lives are still built around the old customs and traditions that make these people different from those of other countries.

Although Chinese culture had influenced Japan even during the prehistoric period, it was not until the introduction of Buddhism in what is called the Asuka period (A.D. 552 to A.D. 645) that the entire Japanese civilization became permeated with Chinese culture. Along with the Buddhists came Confucian learning and the written language.

Naturally, the art forms associated with Buddhism were also adopted. *Suiseki*, the art of appreciating and admiring a stone in its natural form, enjoying nature in miniature, is a very old art form. As early as A.D. 660, we find poems written in Chinese characters in an anthology called *Man Yoshu* (Collection of Myriad Leaves) which extoll the beauty seen in stones.

When written in Japanese characters, the top word is 水, meaning water and is read as *sui*. (When this word is written by itself it is read *mizu*.) The second character is 石 and is read *seki* which means stone or rock. (When written by itself it is read *ishi*.)

It is believed that in the earlier days this art was called *Sansuiseki*. (The word *san* means mountains.) This is probably because the stones collected for this art were from the mountain rivers and streams and not from the seashore. Somewhere in time the first word *san* was dropped and today it is called *Suiseki*.

The philosophy behind this art is to manifest or show nature in microcosm. A truly good specimen is like a rare painting or a beautiful symphony. Upon viewing a stone of this art, you may be inspired with an uplift of feeling or without any effort be led to visualize a picture-like scene, either behind or around it, depending on what it represents and the mood you are floating in. Without their actually being there, you will come to see white, cotton-like clouds floating by near a mountain; or you may even imagine hearing the soft ripple of water in a stream.

As time went by, Buddhist monks meditated before stones placed in a special spot and that helped give them the peace and composure so important to the Japanese.

Tea ceremony masters became enthralled with this new and fascinating art form. After the ritual of preparing and serving the tea was completed, the elite sat on the tatami in silk kimonos with brocaded obis, gracefully sipping powdered tea as they enjoyed the serenity of *Suiseki*.

Soon the Bonsai masters began to consider *Suiseki* a cousin to the art of cultivating graceful miniature trees and they, too, followed the way of *Suiseki*.

Today, in modern Japan, a leader in the field of electronics, textiles and shipbuilding, this nation still very strongly holds firm to its unique and dear customs. The art of *Suiseki* flourishes and people of all walks of life are enthusiasts and followers of this art form.

There is no limit to the types of rocks that can be collected for *Suiseki*. The basic philosophy of the art form is that a *Suiseki* must be as nature created it, with the artistry of time and the elements. It must be natural, a *shizen seki* (natural stone).

There are three very important factors to consider in selecting a good *Suiseki*. First is the form or shape of the stone. It should resemble some form of landscape or object without the necessity of stretching the imagination. Secondly, the stone should not be crumbly and soft, but very hard and solid. The third important factor is color. A rich, deep, subtly blended colored stone is most desirable. Color with depth gives a feeling of strength and gives a life-like power to the stone.

Types of Suiseki

Suiseki can be divided into three categories: *Sansui Keiseki* or *Keijohseki* (Landscape or Scene Stones); *Sugata*

Ishi (Figure Stones); and *Biseki* (Beautiful & Pattern Stones).

In the landscape stones there are numerous classes of which I will list only a few.

Dan Ishi (Terrace or Step Stone). This stone should be formed like a terrace, or steps, with good flat surfaces with at least two steps. It should be very simple, with straight lines but interesting enough to look like a real scene. Many farms are on terraces in Japan because there are more hills than flat lands on which to farm.

Doha Ishi (Hill and Slope Stone). A mountain or hills with a slope or plateau gliding awayward would be considered a *Doha Ishi*.

Taki Ishi (Waterfall Stone). This could be a stone with two types of material, one making up the base stone and the other representing the falling water. The "water" could even be a mineral of some kind. There are many many stones that could fall into this class. However, if one is collecting only the best type of *Suiseki* and is being very selective, one should make certain that the waterfall is realistic. Turn the stone around to see that the material representing the "water" does not go over the top and down the back side. Who ever heard of a real waterfall that flows down two ways?

Mizu Tamari Ishi (Basin or Lake Stone). A stone with a good sized natural depression that holds water would be a *Mizu Tamari Ishi*. A plain depressed stone might be a basin or a puddle stone. If one found a stone that has some high parts around the depression or hole, it might be considered a lake surrounded by slopes and/or low or high mountains. There are many possibilities depending on what the stone looks like.

Simagata Ishi (Island Stone). A stone that is not too large, naturally weathered by wind or flowing water for thousands of years forming a shape resembling something one might see in a bay or ocean, can be called an island stone.

Amayadori Ishi (Rain Shelter Stone). This class of stone is relatively difficult to find. It should be a stone that is formed like a craggy rock or mountain with an overhang. A stone showing a miniature cave or shelter-like formation would fit beautifully into this group. The picture shown of the *Amayadori* stone has a shelter, and in addition, has a natural arch. It is also a rather precipitious mountain and can be called *Seigaku Seki*. It may look like an elephant to one not exposed to the landscape qualities of *Suiseki*. A stone with more than one

Sugata Ishi (Figure stone)
Bird



Amayadori (Rain shelter)
Three combination stone



Shimagata Ishi (Island stone)
in a shiban



Taki Ishi (Waterfall stone)



Kikuka Seki (Chrysanthemum stone)



Kikuka Seki (Chrysanthemum stone)



Kikuka Seki (Chrysanthemum
stone)



Toyama-Gata (Distant
mountain)



Monyo Seki (Pattern stone)

or two combinations is very interesting and also of considerable value.

Toyama Ishi (Distant Mountain Stone). A good specimen should look like a distant mountain. It would be ideal if it showed ridges and canyons with a slight alluvial fan or foothills. If, by some extraordinary chance, the distant mountain has a waterfall and a lake in the foothills, it would be a very very *subarashi meiseki*. (Author's translation . . . stupendous stone!!)

The next category is that of *Sugata Ishi* (Figure Stones). These stones must look like some object, animal, or a person. The shape or form is very important in this group. These include:

Thatched Roof House Stones are collected by many people just as some mineral collectors specialize in coppers or some other particular mineral. The old country houses in Japan have very thick thatched roofs. In addition to landscape stones, the people are relating to things directly near and around them when they collect stones that resemble houses.

Tsubo Ishi (Urn Stone). This is another very popular type of stone collected in Japan that is rather difficult to find. An urn stone must have a natural cavity within the stone that will hold water. These stones are considered rare and make very unusual display pieces when complemented with a few flowers. There are countless stones one can collect in this category. The important thing is, does it really look like the thing it is supposed to represent?

There is no end to the third category, called *Biseki* (Beautiful or Pattern Stones). Instead of the shape or form being the important factor, one now looks for beauty and color of the stones. Is it a good rich color, or does it seem shallow? One will want something that is definite, rich, and penetrating.

In this category fall the Chrysanthemum Stone, known as *Kikuka Seki*, Plum Blossom Stone or *Baika Seki*, Cherry Blossom Stone or *Sakura Ishi*, and *Monyo Seki* or patterned stones.

Of the flower stones, the Chrysanthemum Stone is the most familiar to Americans, although we have seen the other types. To select a truly good specimen, look to see how sharp and clear the feldspar crystals have formed in the shape of a flower. If the petals are clearly formed and by some remote chance are tinted and there is a definite center, it would be a rare specimen. The best flower stones are the ones that look the most realistic.

Monyo Seki (Pattern Stones) give one

a wide range, for they are stones with a design or pattern. It is easy to collect these stones because one is looking for beauty and hardness, while in other categories, form is paramount in addition to the other requisites.

Biseki (Beautiful Stones) can be polished to bring out their beauty and to give the stone life. However, if it is beautiful without the need of polishing, it can be boldly classified as a really natural stone and will be of great value.

An outstanding *Suiseki* has "wabi and sabi." For example, if when quietly sitting before a waterfall stone in meditation, one gradually feels oneself floating into the realm of the miniature scene one starts to hear the roar of the water and even feels cool sprays kissing one's cheeks, that stone has "wabi and sabi." If, no matter how long one looks at a stone it does not move one emotionally in any way, it does not have "wabi and sabi."

Certain stones are always exhibited on wooden stands, usually carved exactly and explicitly for a particular stone. Others can be placed in a *Suiban* (shallow tray) of ceramic or bronze with about a two inch edge. *Biseki* and *Sugata Ishi* are never displayed in a *Suiban* with water but on wooden stands. Just suppose one had a stone shaped like a cat or dog. A dog or cat would look unnatural sitting in the middle of water. Therefore a stand is carved for it to stand on.

Island stones are placed in *Suibans* with water and sand or just water. Other landscape stones can be placed on a stand or in a very shallow *Suiban* with a half inch lip filled with sand only. The shallowness of the tray will give the illusion of the ground and thus make a natural setting for mountain ranges, plateaus, terrace stones, and other scenes.

When placing a stone on a stand or in a tray, always let the stone lean slightly toward the viewer to convey the feeling of embracement and to invite him into the *Suiseki* scene.

Just as an oil painting or water color is not complete until it is framed, a *Suiseki* is not considered finished or complete unless it is placed on a stand or in a *Suiban*. Wooden stands should merely hold up the stone and should not be so elaborate as to detract from the stone. If one notices the stand before the stone, then the stand is much too large or too elaborate.

In recent years, Americans have been fortunate to be introduced to this art that is so different from other arts in their culture. When a painter paints a picture,

it is beautiful, but it is something he has created. When a sculptor sculpts, it is his doing. *Suiseki* is different. *Suiseki* is something man did *not* create. All man does is pick up a stone, enjoy its beauty and ride on "cloud nine" in a dream world of serenity and contentment.

Toy Sato, an authority on Suiseki, has just returned from leading a field trip to Japan in the art form. She has lectured widely on the subject and has previously written an article in Gems and Mineral about Suiseki. A past president of the California Federation of Mineralogical Societies, Mrs. Sato is an Honorary Board member of The Natural History Museum Alliance. This is her first TERRA article.

**Opening
November 29 thru
December 3**

in the
Ethnic Art Shop

Southwest Indian Show

Special guests performing
daily 11 to 3:

Grace McRae

who will show how
Navajo rugs are woven.

White Bear

who will demonstrate the making of
Hopi Kachinas. This is the same
White Bear who created 90 Kachinas
now in the Goldwater Collection
in Arizona's Heard Museum.

Indian Dancers

from The Indian Cultural Center
at UCLA will perform various
tribal dances.

Chizomana

will demonstrate the traditional
art of Hopi tapestry.

All this and a carefully chosen
selection of one-of-a-kind Indian Arts.
Navajo Textiles: Rugs and wall-
hangings in Two Grey Hills, Yei and
Crystal designs . . . Handwrought
Silver: Navajo turquoise and Zuni
inlay—from tie-pins and rings to
magnificent Squashblossom neck-
laces and Concho belts . . . Pottery:
from the Pueblo peoples . . .
Basketry: from tribes throughout the
Southwest . . . Enjoy the fun, bring
your special holiday gift list, and
remember that all Alliance members
enjoy a V.I.P. discount in both
Museum shops.

Foyer, NE Corner

Once upon a Christmas,

By Katharine Bixby Hotchkis

On Christmas Eve the ranch families began to arrive while Father and Mother were still in the dining room with their dinner guests. Since automobiles had gotten more reliable, and pieces of the 30 mile dirt road from Los Angeles had been macadamized, aunts and uncles and other friends were able to join in our Christmas Eve celebrations. They had eaten little suckling pigs raised on the ranch, and now were making champagne toasts and finishing up their brandied mince pie.

We children, with some young cousins, had long since giggled our way through wholesome turkey, milk and ice cream in the nursery. Ready to be hosts, we waited by the patio door of the old Spanish-California adobe house, which, before us, had been the home of our grandparents.

When land-oriented pioneers, like our grandparents from Maine, left their little farms in the East and went West, it was the available land that attracted them to California. The eventual break-up of the vast Spanish-California Land Grants, already in dire trouble because of the vague original surveys of 1794, had been hastened by three consecutive years of devastating drought.

Grandfather John W. Bixby, found on his newly acquired land the crumbling, half-ruined old adobe house whose four-foot-thick walls had been put up in 1806 by the son of a Spanish soldier. As other settlers did, Grandfather fixed the roof, laid wooden floors, and moved in. Later he added to the adobe nucleus two wooden bedrooms and an inside bathroom—and we children were the third generation to live in this Rancho Los Alamitos house.

In the Pueblos of Mexican colonists (like Los Angeles) and near an Early California Mission, the Spanish tradition of celebrating Christmas Eve prevailed. The Piñata, a clay jar filled with candy or small gifts, was hung from a convenient ceiling in the town Plaza. Each child, blindfolded and armed with a long stick, had a chance to smash it. Later, at the nearby Mission, an audience gathered to see the Pageant of the Holy Family, and afterward everyone attended a

candlelit Midnight Mass.

However, out on the isolated ranchos, far distant from Pueblo, Plaza and Mission, the settlers had brought with them from New England, from Pennsylvania, from Virginia, their age-old custom of centering Christmas in the home. All the family and the shepherders, the vaqueros, whoever worked on the ranch, gathered together around a decorated Christmas Tree.

The first Christmas Tree in our generation was in 1906. Perhaps 15 people sat around the candlelit Tree that year. Twenty-four years later, at what turned out to be the last Tree, some 250 were present. In many of the families there was apt to be a new baby every year. New employees at the headquarters and more tenants, all with children, moved onto the ranch. Many of those who had moved off came back for Christmas Eve. Nobody wanted to miss it.

One year a Mexican woman sat interestedly watching everything, and an hour after she got back to her house, gave birth to the baby she must have been expecting all evening. It did not occur to her to stay home; as it did not occur to any of the families to stay home the year it poured rain, the San Gabriel River overflowed, and the bridge went out. They drove their wagons down the muddy road to their side of the river and tied the teams to the pasture fence. Then, carrying the littlest children, they walked across the wobbly planks laid on what was left of the bridge supports, and Father had them brought up the rest of the way in big hay wagons.

For us children, Christmas was not just one evening. It really began soon after Thanksgiving when those of us old enough to stay on a horse went with the foreman to visit all the families. He wrote down the names and ages of all the children, and later the bookkeeper typed up this information into the Christmas List. This took several rides, as some of the houses were miles apart, and our visits were always politely unhurried.

Mother spread a cover over the billiard table, and there she put the wrappings, ribbons, tags, stickers, and the toys and gifts she had laboriously managed to



California 1906 CMB

collect. Every day from then on we tried to help her decide just what would be appropriate for a particular name on the List, then wrapped and tagged it as prettily as possible. Part of Christmas, she said, was being personal—not just grabbing things at random from a big box and passing them out.

Christmas Eve was the Climax! As the families began to arrive, we took turns ushering them in. The youngest ones were helped off with their coats; babies were held while mothers took off their coats; and everyone was somehow seated in the library. On and off, one of us wound up the gramophone for a little music.

Some of the men were shy, all dressed in their best clothes. They hung back together in the hall. When we met them bringing in their teams, and when we helped with the cattle work, they were friends—not bashful at all. But of course we, too, were dressed differently, and were being very polite as we passed around cigars and cigarettes.

The library was full when Father and Mother came out of the dining room. They shook hands and greeted each other, children included, and there was lots of talking and laughing.

Now it was time for the Tree! Father took down the sheets that curtained the sliding glass doors into the living room, and pushed them back. There, covered with glittering ornaments, glowing with the flickering light of lots of little candles, mounds of presents stacked underneath—there was the enormous Tree.

Because of the low ceiling, the natural point of the tree where the Christmas Star should hang had to be sacrificed for a thick beautiful denseness. Father would get a tall, wide tree and cut off the top to make it fit. The long green branches would then spread out even along the ceiling.

We stood at the entrance of the living room as enthralled as all the other children. It seemed like something never before seen or imagined. Maybe it was the shimmering light of the candles. Even after strings of electric lights were invented, Mother still clung to candles. But she never forgot to assign someone

to do nothing except see that the Tree didn't catch on fire.

The smaller children squeezed up on Navajo rugs close to the Tree. Everyone else sat on folding chairs crowded into the room, and the overflow of guests looked on from the library and the billiard room through the wide archway doors.

Mother picked up a present, wrapped and tied with bright ribbon, and looked at the tag.

"Casimiro Ramirez!" she called.

A little black-eyed boy sitting on one of the Navajo rugs smiled with joy and reached out his hand.

We helped Mother call the names and give out the presents—Casiano, Salvador and Trinidad Sisneros, Suseki Kawasaki, Frank Tanaka, Fumiko Kawasaki, DePauw, Cannou, Emil Cosyns, Wendell Wilson, Pearl Smith, Mrs. Yamamoto.

This year the women were getting presents for their houses. The year before it had been something for themselves. Mrs. Yamamoto beamed her thanks across all the heads as she untied the red ribbon and found a big bath towel.

Father came stepping carefully through and over the children and stood in front of the Tree.

"Tex!" he called, looking from one side to the other for the bronco-buster. "Where's Tex? Oh, there you are."

Everyone was already smiling as they turned their heads about until they spotted Tex, who stuck up his hand and looked both embarrassed and pleased.

"The other day"—Father confided to the audience—"I saw the back of Tex's shirt all covered with dust and barley stickers! So I decided that this would be a pretty appropriate present for a person who's so careless about letting his back get dirty!"

Holding it so all could see, he wound up a small mechanical horse who bucked a time or two and then threw over its head the little tin rider in his painted tin chaps. Great guffaws—and the horse was passed back from hand to hand until it reached the blushing Tex.

Some more "joke presents" and then Father went into the hall and dipped up whisky punch from a big cut-glass bowl

for the men who came out to talk and have fun with the "Boss".

Someone was detailed to distribute cornucopias of candy and pass trays of peppermint candy canes. By now the entertainment had begun in front of the Tree, and as the small children watched, dreamily sucking their candy canes, their fronts got stickier and stickier. The mothers were just as absorbed. Without removing their eyes from what was going on, they absentmindedly jiggled a small child to sleep, or nursed a baby, or fed one a bottle.

The entertainment was different each year, the favorite being a magician. Slick and smooth-talking, he twitched up his cuffs, showing his empty hands, front and back and then bent down to curly headed Esperanza Reyes sitting at his feet.

"Well for goodness sakes! What's this!" His own tones of amazement mingled with the astonished gasps of his audience, as out of her hair he took a live yellow chick! She couldn't believe it, and looked back at her mother for explanation. The other children put their hands up to their heads—half hoping, half afraid.

"And what have we here?" The magician flipped out of Albert Lerno's tightly buttoned little shirt the two missing cards for a "full house" in the poker hand he was holding up. The audience was flabbergasted.

"Well I'll be dawg-goned!"

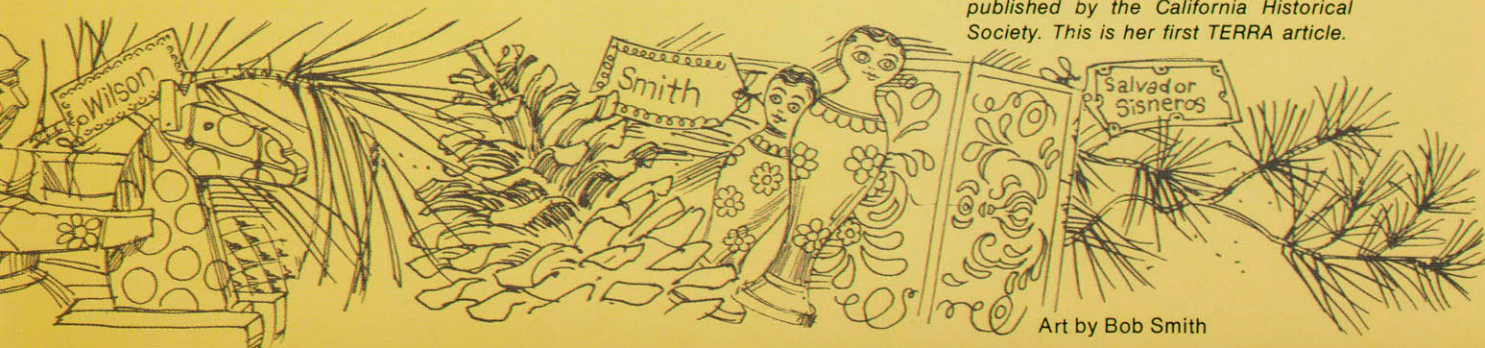
"Carramba!"

"How'd he do that?"

When the entertainment was over, we helped our guests put on their coats. And it was "Goodbye!" "Adios!" "Buenas Noches!" "Merry Christmas to you!" 'til everyone was gone, leaving only Father and Mother and us.

We folded up some chairs to make a little more space, and scraped off the Navajo rugs some of the stickiest spots of candy. And then—we went behind the Tree and each of us fished out our own two presents—one from Mother and one from Father—and the surprise presents we had secretly made for them.

Katharine Bixby Hotchkis is the author of two books, Trip with Father and Christmas Eve at Rancho Los Alamitos, published by the California Historical Society. This is her first TERRA article.



Art by Bob Smith



The Plants of Yuletide

by Alphonse Bernhardt

Of the several plants that are associated with the yuletide season, most have origins founded in ancient mythologies. The word yule itself is a corruption of the ancient Anglosaxon *Geol* or *Heoul* designating the winter solstice, and the attendant celebrations predate Christianity by centuries. It was at this time that the Druids drank their malted beverage ale—a derivative from the seasonal name. Such festivities included plants that are now a part of our Christmas season, and most of these were of symbolic or sacred import.

Few plants are more favored at Christmas than the mistletoe (*Viscum album*) which hangs above doors to bring the lips of lovers and strangers together. To the ancient Druids and Norsemen this was an herb of great import. Freya once revealed to Loki that her son's invulnerability in combat with the gods could only be overcome by the diminutive mistletoe, and since it was so small, he had nothing to fear. The jealous Loki took a stout twig and fashioned a spear of it and gave it to Hodur and with instructions to fell Baldur. This brought about the lad's death, but the combined forces of the gods brought him to life again, and the mistletoe was forced to never again touch the earth; for as long as it

remained on the branches of trees or above the soil, it would bring good fortune; Freya became its protectress.

When the Druids were prepared to go to war, they cut the sacred mistletoe as an act portentous of their preparation for battle. Christian monks believed that the mistletoe was at one time a tree of considerable stature, and was used to fashion the cross upon which Jesus was crucified. Since that time the accursed plant was reduced to a humble parasite frequenting the boughs of oak and other trees. In commemoration of the death of Christ, these pious monks would eat chips of the woody stems of mistletoe as an act of humility and piety. Now the green-gold parasite with its translucent white berries recreates the lost mythology at yuletide by hanging, with Freya's favor, above our doors.

The fir tree (*Abies* sp.) has found favor over the spruces, pines and other Christmas trees not only for its delicate beauty, but because of the curious sacred traditions which have surrounded it. In Greek mythology the fir tree was originally a priest of Cybele by the name of Atys who, having fallen from virtue, was metamorphosed by Zeus. Peoples of the Hartz Mountains believe that a spirit abides in the branches of the fir in the form of an imp who is able to grant

wishes if one encircles the tree and dances about it to prevent his escape. To some the imp was the god Odin himself and later St. Nicholas. Lighting the fir tree with candles devolves from a tradition in which it was believed that candles burning on a fir tree and casting a shadow on the wall were prophetic. If a person's shadow appeared without a head, it was a portent of his death within the year. The lower branches of the fir tree were placed across the foot of a bed to drive away "nightmares." Partially burned fir branches will ward off lightning and keep grain-stealing spirits from a barn. These legends regarding the fir have had quite an impact on history, for when the temple at Jerusalem was built, the beams were hewn of fir; and when a storm felled a large fir tree in old Russia, it was given to the Church and the wood was not to be sold. Even St. Martin had his difficulties with the trees, for when he ordered them to be destroyed at the time of the razing of a heathen temple, his people, instead of obeying, rose against him in defense of their beloved firs.

Lest the reader think that preference was given to the fir as a tree of Christmas for reason of its unusual history, let us consider the more common pine as it figures into this Christmas tradition.



photo by Susan I. Smith

Poinsettia

Again Cybele, mother of the gods, enters; being jealous of the flirtations of a shepherd with whom she had become enamoured, she changed him into a pine so that she might sit beneath his branches mourning (in great satisfaction). She even elicited the sympathy of Jove, who determined that the branches of the tree should be ever green in memory of that love. When St. Sulpicius wrote his biography of St. Martin, he assigned a diabolical nature to the pine; the only logical explanation for this would seem to be that St. Sulpicius could not distinguish between firs and pines and recalling the problem that St. Martin had in attempting to fell the firs, he felt obliged to cast aspersions upon such a tree. *Pinus* denoted a raft in ancient times, and the wood was consecrated to the god Neptune. Musical in its "breathing," the pine was married to the wind, Boreas, and all of the knots in the wood were believed to be places where their children escaped.

In the Christian tradition it is said that Mary in her flight rested beneath the boughs of a pine and for this reason the cone, in section resembles the hand of Christ. Near Coburg it is said that a pine tree was found with the image of the Virgin concealed within its trunk. When

the image appeared to a local priest, a church was erected on that ground.

Even in cold climes, the Christmas rose (*Helleborus nigrus*) pushes through the snow in the dead of winter to exhibit a rose-green flower, so symbolic of the season. Unfortunately the scent betrays all romantic illusions which one might harbor, for it is decidedly foul. The ancients believed that it should be in sick rooms where it was to take the odor (then associated with illness) from the room and cure the invalid. The Greeks went so far as to claim that it cured madness and to this end they sent their mentally ill populace to Anticyra where the plant grew in abundance. Later, in Germany, it was associated with Hulda, goddess of marriage, and was said to cure melancholy (an attribute of the married state?). In Christian legend the Christmas rose appeared for the first time at the nativity of Christ to provide an offering for a shepherdess who had no precious jewels or perfumes to offer; it is said that the infant took one of these to himself in preference to the more precious gifts of the magi. The legends are closely tied to those of the mandrake and in some Mediterranean areas the plant was treated as an herb of grace being used sacramentally in blessing domestic

The Plants of Yuletide



animals.

The Saturnalia was a Roman festival beginning on December 17 and was a pagan holiday characterized by license and vice. During this period of revelry, friends sent boughs of holly (*Ilex aquifolium*) to one another accompanied by gifts. Even prior to this the Druids covered their huts with holly to make them an abode for the forest spirits. Because of this strong association with pagan worship and the use of the plant to repel poison and witchcraft, the church at Bracara forbade the use of holly as a church decoration. Later traditions were formulated that declared holly to have sprung from the footsteps of Christ and the berries were said to be symbolic of his sufferings and loss of blood. The holly and the ivy are frequent refrains in English Christmas carols, but there was a time when ivy (*Hedera*), like holly, was banned from the churches by an act of one of the early church councils. Ivy was consecrated to Bacchus, god of wine, and it was said that a wreath of ivy on the brow would prevent intoxication. Thus during the ancient festivals of the Saturnalia and Heoul, ivy garlands were abundant to permit the revelers to drink in excess without, supposedly, becoming intoxicated.

One of the most spectacular Christmas plants is the poinsettia (*Euphorbia pulcherrima*) which is native to Mexico and Central America. Having relatively little history compared to other plants of this season, the poinsettia was introduced into the United States in 1828 by Joel R. Poinsett of Charleston, South Carolina, who was at that time U.S. minister to Mexico. Curiously, what we take to be bright red flowers are nothing more than modified, highly pigmented leaves. Poinsettia flowers are small, almost inconspicuous, yellow-green knobs in the center of the crimson bracts. To Mexicans in the area of Oaxaca, Guerrero, and Chiapas the poinsettia had always been known as *flor de noche buena* as it usually was in bloom on Christmas Eve. Now many countries have adopted it as the traditional Christmas flower.

Thus it would seem that the plants which we associate with the Christmas season are, with the exception of the poinsettia, merely vestiges of earlier pre-Christian festivals falling at the same time of the year. Good Old St. Nicholas has his predecessors in Odin, Bacchus, Saturn and other pagan deities; who were properly celebrated during the winter solstice which approximates our Christmas season.

Alphonse Bernhardt, recently retired from a career on the stage and in the world of art, is currently devoting himself to the writing of his memoirs and various other ephemera. This is his first appearance in this guise for TERRA.



Helleborus orientalis
(*Helleborus nigrus*
is the true
Christmas Rose)

photo by Mildred Davis

Pinyon Pine Cones
Pinus Edulis



The Plants of Yuletide



Mistletoe



Dinosaurs of Baja California

by William J. Morris

26

How big is a big dinosaur? The record length and bulk is correctly attributed to the sauropods, a group which includes *Brontosaurus* (at present more correctly called *Apatosaurus*). The duckbills, or hadrosaurs, while they would certainly look impressive standing among a living group of animals, were of more modest dinosaurian dimensions. Lengths of 25 to 30 feet and weights of 6 to 8 tons would have characterized most adults of these plant eating hadrosaurs. It is true that reptiles, unlike mammals, continue to grow, but the rate of growth slows drastically as life proceeds. Therefore, even if some duckbills lived extremely long lives it is doubtful if well known, previously reported forms greatly exceeded these dimensions. Two years ago this traditional portrait of hadrosaurs was altered. We have discovered, in Baja California, fragments that indicate hadrosaurs approached, and indeed surpassed, many of the sauropods in length as well as bulk.

The work, climaxed with the discovery of giant hadrosaurs, began in 1965 during expeditions to Baja California sponsored by the Museum and the National Geographic Society. As is usual in many cases the initial discovery was made quite by accident in a canyon approximately 2 miles west of the small village

of El Rosario, Baja California. We were returning from the investigation of a fossil site discovered by Dr. Applegate and Mr. Garbani at Punta Prieta, 300 miles south of El Rosario. Before continuing to Ensenada from El Rosario, a distance of 150 miles, we decided on a day of rest. It was a postman's holiday—we had heard that scraps of dinosaur bones had been found in the hills west of El Rosario and decided to see for ourselves. Our first effort produced not scraps but a reasonably complete hadrosaur skeleton. The specimen was not collected but the project was initiated.

Why were we the first to find reasonable specimens rather than worthless scrap? Previous investigators simply did not look in the right place. The most valuable specimens were found in the deeply dissected steep slope along the remote western rim of the El Rosario mesa. The terrain is rugged, roads nonexistent, and so each specimen varying from 200 pound limb bones to 2100 pound blocks containing partial skeletons were carried, pushed, shoved, and slid to the nearest Jeep road. By number of specimens the collection is not impressive, but by the ton it is.

Today the mesa ends abruptly at steep, rocky cliffs facing the Pacific

Ocean strandline. Occasionally this westward facing escarpment is broken by small sandy beaches. To the south the westward flowing drainage of the Arroyo del Rosario lies in a wide floodplain merging with lagoons and a rocky beach at its Pacific mouth. Eastward the rolling, often deeply dissected upland abuts against the mountainous spine of Baja California. These mountains are the major source of the sediments filling the existing depositional sites. The geographic situation has not changed much in the 70 million years since deposition of the dinosaur bearing strata. Indeed, to a scientist used to a mobile earth, it seems strange that in all of this time the Pacific strandline has remained so constant in position. It was only after deposition of the dinosaur bearing strata that the sea, for a short interval, transgressed eastward over the El Rosario area, perhaps causing the final extinction of the Baja California dinosaurs.

We know from the preserved flora that the dinosaurs did not live in jungle or in extensive savannahlands. Their habitat was forested, and except for a few exotic elements, would not look out of place in the inner coastal plain sections of southeastern United States. Evidence of the ancient forests is impressive as

C. F. Lambeosaurus

Hadrosaurs or "duckbill" dinosaurs come in a variety of sizes. *Corythosaurus* is an average size for these dinosaurs while *Edmontosaurus* was considered to be one of the larger forms until the Baja California hadrosaur, Cf. *Lambeosaurus* was discovered. Although only a few bones of this giant hadrosaur have been discovered a reasonable restoration was made using partial skeletons of related but smaller forms. The body of Cf. *Lambeosaurus* was not nearly as bulky as the silhouette would indicate. A good deal of the height is due to a thin but high ridge extending down the back and merging with the narrow, tall tail. The drawings are to the same scale as the figure of the man in the lower right.

Edmontosaurus

Corythosaurus





By the beginning of the 1972 field season considerable overburden had been removed from the site of the giant hadrosaur by pick and shovel. The compressor, still under

wraps, had not been used when the picture was taken. Most of the hill to the left must still be removed if we are to recover the remainder of the skeleton.

petrified wood is everywhere. In higher strata whole forests of trunks, and even occasional root systems, are preserved. Careful analysis of the sediments indicate that the dinosaurs were preserved in three environmental situations.

Most common are isolated bones or fragments of bones brought to their final burial during sporadic flood states of the river system. The bones are often abraded and occur in coarse sediment derived from the eastern mountains.

The second most common occurrence is representative of quick burial after an animal had died and partially dessicated on the exposed valley flats adjacent to rivers. These dinosaurs were covered, and so preserved, during the flood stage of the rivers when sediment was deposited outside of the river channel. One specimen, a series of neck and back vertebrae preserved in this manner was found with the imprint of the scaly skin faithfully reproduced in the fine flood-plain silts deposited around the dessicated partial skeleton. The animal had undergone partial decay before burial for tiny clusters of the fossilized egg cases of maggot-like insects were found adhering to the bone and skin impressions.

The third method of preservation was burial in the black, oxygen impoverished

muds of swamps or lakes. These specimens are always disarticulated, suggesting that the animal died elsewhere and was transported a considerable distance before burial. The few bones we have of the giant Baja hadrosaur were found in this kind of depositional site.

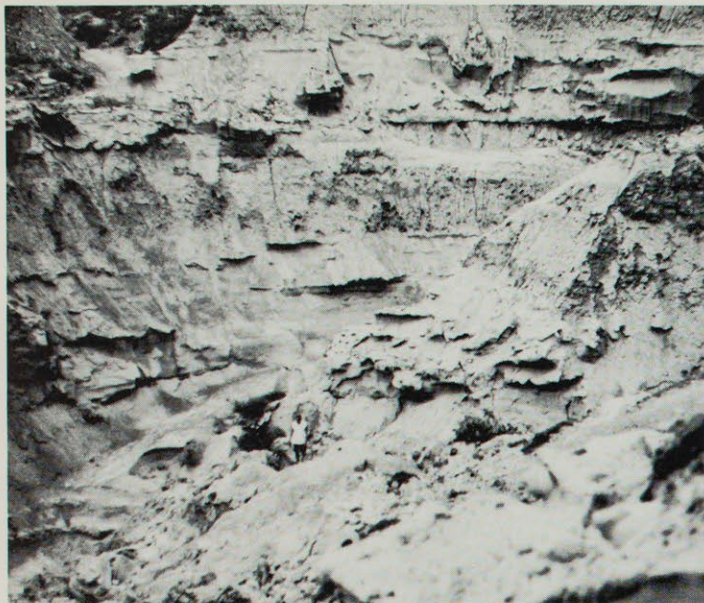
Only one kind of duckbill dinosaur seems to be represented in the Baja strata. It is a new one and, as yet, does not have a formal scientific name. It is quite closely related to two kinds, *Corythosaurus* and *Lambeosaurus* from the Cretaceous deposits of the Rocky Mountain foothills in Alberta, Canada. A specimen of *Corythosaurus* is on display in the Hall of Evolving Life in the Natural History Museum. These dinosaurs are all characterized by having a hollow, boney crest on the top of the skull. The function of the crest is difficult to determine. A recent speculation is that it served as an accessory olfactory chamber to enhance the sense of smell. Although this may have been one function, it may have had another more fundamental one. I think that this lineage of duckbills was very aquatic, spending most of their time feeding and lazing in shallow water marginal to ancient seaways. Reptiles are "cold blooded" and in order to replenish heat to submerged parts of the body the

crested head remained out of water exposed to the intense Cretaceous sun. Thinly walled blood vessels matting the inside of the crest would bring cool blood close to the surface where it would be heated before circulating to submerged parts of the body. Many modern lizards have similar devices.

The Baja duckbills have one major difference which separates them from their closest Canadian relatives. They have a very tall but laterally compressed tail. This, to me, suggests a very strong aquatic adaptation. The Baja duckbills most likely spent most of their time in the water, the tail being used to skull the animal on his search for food in the shallow lagoons. The tall dorsal spines of the tail continued up the back to the neck forming a very prominent ridge. Measurements from several individuals indicate an average length, from nose to tail, of about 40 feet, well above the maximum for previously described North American hadrosaurs. We were content with this record, but were amazed when, during the 1970 field season, Alan Tabrum, then a student at Occidental College, reported back to camp the finding of an upper arm, or humerus, that had almost twice the bulk of our previous record.



Mike Hammer is holding the upper arm bone, humerus, of a forty five foot relative of the Baja California giant. The actual humerus of the giant hadrosaur is shown to the left. The ruler is twenty two inches long.



Relief within the badlands and major producing areas is extreme as indicated by the figure in the foreground. The almost vertical cliffs formed by massive sandstone and siltstone layers cause great difficulty in collecting bones as large as those of the hadrosaurs. It was even

impossible to get burros into the particularly isolated basin shown. All materials including plaster and water had to be carried into this area and large blocks containing bones had to be inched overland to the nearest Jeep road some three miles away.



Looking north towards the south rim of the El Rosario Mesa. Dinosaur bearing strata outcrop along the south and west escarpments of the mesa. The most productive horizons are located in extremely dissected areas approximately four miles to the north of the valley wall.

30

After our initial enthusiasm wore off, we were taken aback by the magnitude of the work involved in recovering other bones of this gigantic duckbill dinosaur. Using the humerus as a base for our calculations, careful comparative measurements indicated an over-all length of 55 to 60 feet and a weight of 28 tons. At the site, scattered ends of bones and eroded fragments protruded from one horizon for a distance of several hundred feet. In addition, the bone layer was near the foot of a hill and overlain by 30 feet of hard sandstone and siltstone. The first summer after the initial discovery, we used picks and shovels and removed approximately ten to fifteen tons of overburden. The next summer we transported a large air compressor and jack hammers to the site. Those of you familiar with the back country of Baja California realize that this, in itself, was an arduous, exasperating task. When we had finally built the last of a road, pushed and winched the two ton machine to the quarry, the incongruity of the situation provided an amusing situation—a huge red compressor with a sign atop proclaiming its ownership to be a well known rental agency, sitting in isolated splendor among the cactus and cholla of Baja California.

By the end of the second summer many more tons of overburden were removed. The skeleton, however, is too scattered for effectiveness with our methods. In all, only 3 vertebrae, a fibula, some scrap, and possibly one tooth of the giant hadrosaur has been recovered. The great size of these fragments does bear out the correctness of our original calculations.

We have been defeated for a time in removing the staggering amount of overburden from the site. The Mexican Government willing, a paved road will be completed to El Rosario in the next three years, and we will return, only this time with bulldozer and earth movers to help us.

Our eight years' work in Baja California has given us an interesting, tantalizing glimpse into a time when giant duck-billed dinosaurs and huge predaceous forms lived along with some of the first tiny mammals close to the Pacific shore. To date we have investigated only a small part of the possible fossil localities, perhaps 10 percent, and so it is evident that as work continues, many more discoveries await us.

William J. Morris, Professor of Geology, Occidental College, and Research Associate in Vertebrate Paleontology



James Garbani, formerly chief field assistant on the Baja Expeditions, is shown preparing the lower hind limb of a hadrosaur prior to its removal from the dinosaur bearing El Gallo Formation. The tibia and part of the fibula is shown. When completely uncovered the entire limb, 12 feet long, from the pelvis to the end of the tibia was present. The tibia alone when encased in its plaster jacket weighed approximately 250 pounds. Fossils as large as this and even larger blocks had to be hand moved several miles to the nearest Jeep road.

Christmas and Chanukah in the **ETHNIC ARTS SHOP**

- | | | |
|---|---|---|
| 1. Hopi Kachina Tree Ornament—
Painted Wood with Feather—
Arizona .50 | 4. Straw Cathedral—Mexico \$5.00 | 7. Santa Claus Tree Ornament—
Painted Wood—Taiwan \$1.00 |
| 2. Menorah—Reproduction of 6th-7th
Century Piece—Israel \$9.00 | 5. Snowflake Ornament—Crocheted—
Portugal \$1.00 | 8. Falasha Lion with Star Crown—
Ethiopia \$4.00 |
| 3. Cornhusk Doll Creche—
Czechoslovakia \$8.50 | 6. Candle Holder Tree—Painted Tin—
Mexico \$8.50 | 9. Fish Ornament—Brightly Colored
Cloth—China \$1.00 |



Photos by Armando Solis

Natural History Museum
Exposition Park, Los Angeles, California 90007
Address Correction Requested

Non-Profit Organization

U.S. Postage

PAID

Los Angeles, California

PERMIT NO. 13945

MISS MARY BUTLER
6610 W OLYMPIC BLVD
LOS ANGELES CA 90048
SH7

LOS ANGELES COUNTY NATURAL HISTORY MUSEUM

DR. GILES W. MEAD
Director

CHARLES F. GEHRING
Assistant Director

DR. THEODORE DOWNS
Chief Curator, Earth Sciences

DR. FRED S. TRUXAL
Chief Curator, Life Sciences

DR. HARRY KELSEY
Chief Curator, History

RICHARD LIPSCOMB
Chief of Education

NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY BOARD OF GOVERNORS

ED N. HARRISON
President

DR. M. NORVEL YOUNG
Vice-President

RICHARD CALL, M.D.
Secretary

JOHN BROWN COOK
MRS. JUSTIN DART
TIMOTHY M. DOHENY
C. V. DUFF

WILLIAM M. GARLAND, II
DAVID W. HEARST
NORMAN O. HOUSTON
FREDERICK LLEWELLYN
CHARLES O. MATCHAM
RICHARD C. SEEVER
MYNATT SMITH
MRS. E. HADLEY STUART, JR.

NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY BOARD OF TRUSTEES

RICHARD CALL, M.D.
President

DR. M. NORVEL YOUNG
Vice-President

MRS. E. HADLEY STUART, JR.
Secretary

RICHARD C. SEEVER
Treasurer

C. F. GEHRING
Assistant Treasurer

RICHARD P. CARLSBERG
JOHN BROWN COOK
MRS. JUSTIN DART
TIMOTHY M. DOHENY
WILLIAM W. DREWRY, JR.
C. V. DUFF

WILLIAM M. GARLAND, II
ED N. HARRISON
LEWIS J. HASTINGS
DAVID W. HEARST
NORMAN O. HOUSTON
MRS. EDWARD B. LILLY, JR.
FREDERICK LLEWELLYN
DOUGLAS J. MACDONALD
CHARLES O. MATCHAM
JACKSON SESNON
MYNATT SMITH
JOHN G. WIGMORE

NATURAL HISTORY MUSEUM ALLIANCE BOARD OF DIRECTORS 1972-1973

MR. LEWIS J. HASTINGS
Chairman of the Board

MR. LAWRENCE JEFFRIES
First Vice Chairman

MR. JOHN WIGMORE
Second Vice Chairman

MR. FRANK GRANT
Third Vice Chairman

ELECTED BOARD

MRS. M. L. BRITAIN, III
MR. RICHARD P. CARLSBERG
MR. MICHAEL DART
MRS. ROBERT EDWARDS
MRS. ALLAN HERBERT
MRS. JOHN HUBBARD
MR. JOHN JONES
DR. JOSEPH KRAUSE
MRS. MAURICE MACHRIS
MR. G. EVERETT MILLER
MR. ROBERT P. MILLER, JR.
MRS. LLOYD MILLS, JR.
MRS. MAX MINTZ
MR. RANDALL MYERS
MRS. STEPHEN P. NEWMARK
DR. WALTER NICHOLS
MRS. PAUL O. PLATT
MRS. EWING SELIGMAN
MR. MELVIN SHAW
MR. WILLIAM E. SIEGEL
MRS. LEON I. SINGER
MR. HOWARD SMITS

MRS. THOMAS REDDIN
Secretary

MR. WILLIAM W. DREWRY, JR.
Immediate Past Chairman

MEMBERS-AT-LARGE
MRS. DAVID DUQUE
MRS. RICHARD SCHUUR

HONORARY LIFE MEMBERS

MR. C. V. DUFF
DR. HERBERT FRIEDMANN
MR. ED N. HARRISON
MISS RUTH MAHOOD
MR. CHARLES O. MATCHAM

HONORARY MEMBERS

MRS. BRUCE BELT
MRS. MORTIMER KLINE
MRS. KENNETH LEVENTHAL
(EX-OFFICIO)

DR. GILES MEAD (EX-OFFICIO)
MRS. LYNN E. PARKHURST
MR. J. NEIL REAGAN
MRS. YUZY SATO
MRS. OSCAR A. TANNENBAUM
MR. JOHN R. THOMAS
MRS. BRUCE THROCKMORTON
MRS. IRWIN WEINSTEIN (EX-OFFICIO)

RESEARCH PANEL

MR. HARRY J. PACK
MR. ROBERT WEINSTEIN

ADMINISTRATIVE SECRETARY

MRS. FRAN KELLOUGH

Museum Alliance Membership

There is something in it for everyone! You are invited to become a member of the Natural History Museum Alliance, to participate in its programs, to receive its publications, and announcements.

Membership privileges and pleasures include:

1. Subscription to the Alliance TERRA
 2. The monthly CALENDAR OF EVENTS
 3. Family participation programs—NEW DIMENSIONS TO DELIGHT—tickets available only to members
 4. 10% discount on most items at the Museum Bookshop and Ethnic Arts Shop
 5. Invitations to previews and receptions for new exhibitions and to meet lecturers
 6. Program of benefits for children
 7. Group travel program
- Memberships are available in the following categories:
- | | |
|--------------|---------------------------|
| Active | \$12.50 |
| Contributing | \$25.00 |
| Sustaining | \$100.00 |
| Life | \$500.00 (single payment) |

Make checks payable to: MUSEUM ALLIANCE
900 Exposition Boulevard
Los Angeles, California 90007